

1 (currently amended). A method for fabricating an electrical connection, the method comprising:

~~providing an electrically non-conductive layer of a first selected material, having a first selected thickness, on an exposed surface of a substrate of selected substrate material;~~

providing an electrically conductive layer of a second selected material, having a second selected thickness, in a first selected pattern having at least first and second spaced apart conductive layer components, on an exposed surface of the non-conductive layer;

depositing a catalyst array, including at least first and second spaced apart catalyst array elements, of metallic nanowire ("MeNW") catalyst material of a selected catalyst thickness on the respective first and second conductive layer components;

providing a gas or vapor of a selected metallic ~~or organometallic~~ material around the catalyst array, and allowing at least first and second MeNWs to grow, substantially perpendicular to a plane Π of the conductive layer on the respective first and second conductive layer components;

providing a diffusion barrier of a selected barrier material as a thin coating surrounding a side wall of the at least two MeNWs and overlying exposed portions of the conductive layer, to prevent migration of the MeNW conductive layer material;

depositing an insulation layer of a selected insulation material over the exposed portions of the conductive layer and around the at least two MeNWs so that an interstitial region between the at least two MeNWs contains the insulation material; and

applying a chemical mechanical polishing process ~~or etching process~~ to remove a fraction of each of the at least two MeNWs, and a fraction of the insulation layer so that each of the at least two MeNWs has an end exposed.

2 (original) . The method of claim 1, further comprising applying an electrical field E1, substantially perpendicular to said plane Π , as said at least one MeNW is grown.

3 (original). The method of claim 1, further comprising applying an electrical field E2, substantially parallel to said plane Π , as said at least one MeNW is grown.

4 (canceled).

5 (previously amended). The method of claim 1, further comprising selecting said diffusion barrier material from the materials Ti_xN_y and Ta_xN_y , where x and y are positive numbers.

6 (canceled).

7 (previously amended). The method of claim 1, further comprising selecting said diffusion barrier material from the materials Ti_xN_y and Ta_xN_y , where x and y are positive numbers.

8 (original). The method of claim 1, further comprising selecting said conductive layer material from a group of materials that includes Cu, Ag, Au, Pt, Pd, Ni, Fe, Co, Ir, Ti, Zr and a metal-doped silicide

9 (original). The method of claim 1, further comprising selecting said catalyst layer material from a group of materials that includes Al, Au, Ag, Ni, Ir, Mo, Pt and Pd.

10 (original). The method of claim 1, further comprising selecting said metallic material for said at least two MeNWs from a group of materials that includes Cu, Cu_xO_y , Al, Al_wCu_z , Ag, Au, Pt and Pd, where w, x, y and z are positive numbers.

11 (original). The method of claim 1, further comprising selecting said insulation material from a group of materials that includes Si, Si_aO_b and Si_cN_d , where a, b, c and d are selected positive numbers.

12 (original). The method of claim 1, further comprising selecting said thickness of said catalyst layer in a range 0.1 – 20 nanometers.

13 (previously amended). The method of claim 1, further comprising selecting said thickness of said conductive layer in a range 0.2 – 250 nm..

14 (original). The method of claim 1, further comprising providing at least one of said at least two MeNWs with a diameter, measured in a plane substantially parallel to said plane Π , in a range 1 – 250 nm.

15 (canceled).

16 (new). The method of claim 1, further comprising choosing said diffusion barrier material to be an electrically conductive material.